WHAT IS CLAIMED IS:

1. A channel estimation apparatus in a digital communication system comprising:

a correlation unit for obtaining a correlation function of a first received signal by means of a correlation between a received synchronizing signal and a reference synchronizing signal, and obtaining a correlation function of the received synchronizing signal by means of a correlation between the synchronizing signals;

a first estimating unit for estimating a first multi-path by applying a first threshold value to the correlation function of the first received signal;

a correlation noise removing unit for obtaining a correlation function of a third received signal by removing correlation noise included in the correlation function of the first received signal, by means of the first multi-path; and

a second estimating unit for estimating a second multi-path by applying a second threshold value to the correlation function of the third received signal in which the correlation noise has been removed.

2. The channel estimation apparatus in a digital communication

system as claimed in claim 1, wherein the correlation noise removing unit obtains a channel impulse response function $h_{\tau m}$ backtracked by means of the first multi-path $y_{\tau m}$ in which $_{\tau m}$ represents a location of the estimated multi-path, obtains a correlation function y_n' of a second received signal by means of the backtracked channel impulse response function $h_{\tau m}$, obtains the correlation noise N_n by subtracting the backtracked channel impulse response function $h_{\tau m}$ from the correlation function y_n' of the second received signal, and obtains the correlation function y_n'' of the third received signal by removing the correlation noise N_n from the correlation function y_n of the first received signal.

3. The channel estimation apparatus in a digital communication system as claimed in claim 2, wherein the backtracked channel impulse response function $h_{\tau m}$ is defined by an equation,

$h_{\tau m} = x_{\tau m}^{-1}\ y_{\tau m}$, wherein $x_{\tau m}$ is the correlation function x_n of the synchronizing signal corresponding to τm.

4. The channel estimation apparatus in a digital communication

system as claimed in claim 2, wherein the correlation noise N_n is defined by an equation,

$$N_n = y_n' - h_{\tau m}$$

5. The channel estimation apparatus in a digital communication system as claimed in claim 2, wherein the correlation function y_n'' of the third received signal is defined by an equation,

$$y_n'' = y_n - N_n = y_n - (y_n' - h_{\tau m})$$

6. The channel estimation apparatus in a digital communication system as claimed in claim 1, wherein the correlation noise removing unit removes the correlation noise in sequence according to a size of the first multi-path $y_{\tau m}$.

7. The channel estimation apparatus in a digital communication system as claimed in claim 1, wherein the correlation noise removing unit removes the correlation noise according to a sequence in which the first multi-path $y_{\tau m}$ is received.

8. The channel estimation apparatus in a digital communication system as claimed in claim 1, wherein the reference synchronizing signal is a PN sequence.

9. A channel estimation method in a digital communication system comprising the steps of:

(1) obtaining a correlation function of a first received signal by means of a correlation between a received synchronizing signal and a reference synchronizing signal, and obtaining a correlation function of the received synchronizing signal by means of a correlation between the synchronizing signals;

(2) estimating a first multi-path by applying a first threshold value to the correlation function of the first received signal, which represents a location of the estimated multi-path;

(3) obtaining a correlation function of a third received signal by removing a correlation noise included in the correlation function of the first received signal, by means of the first multi-path, and

(4) estimating a second multi-path by applying a second threshold value to the correlation function of the third received signal in which the correlation noise has been removed.

10. The channel estimation method in a digital communication system as claimed in claim 9, wherein, in step 3, channel impulse response function $h_{\pi m}$ backtracked by means of the first multi-path $y_{\pi m}$ is obtained, a correlation function y_n' of a second received signal is obtained by means of the backtracked channel impulse response function $h_{\pi m}$, the correlation noise N_n is obtained by subtracting the backtracked channel impulse response function $h_{\pi m}$ from the correlation function y_n' of the second received signal, and the correlation function y_n'' of the third received signal is obtained by removing the correlation noise N_n from the correlation function y_n of the first received signal.

11. The channel estimation method in a digital communication system as claimed in claim 10, wherein the backtracked channel impulse response function $h_{\pi m}$ is defined by an equation,

$h_{\tau m} = x_{\tau m}^{-1} \, y_{\tau m}$, wherein $x_{\tau m}$ is the correlation function x_n of the synchronizing signal corresponding to τ m.

12. The channel estimation method in a digital communication system as claimed in claim 10, wherein the correlation noise N_n is defined by an equation,

$$N_n = y_n' - h_{\tau m}$$

13. The channel estimation method in a digital communication system as claimed in claim 10, wherein the correlation function y_n'' of the third received signal is defined by an equation,

$$y_n'' = y_n - N_n = y_n - (y_n' - h_{\tau m})$$

14. The channel estimation method in a digital communication system as claimed in claim 9, wherein, in step 3, the correlation noise is removed in sequence according to a size of the first multi-path $y_{\tau m}$.

15. The channel estimation method in a digital communication system

as claimed in claim 1, wherein in step 3, the correlation noise is removed according to a sequence in which the first multi-path $y_{\pi m}$ is received.

16. The channel estimation method in a digital communication system as claimed in claim 9, wherein the reference synchronizing signal is a PN sequence.